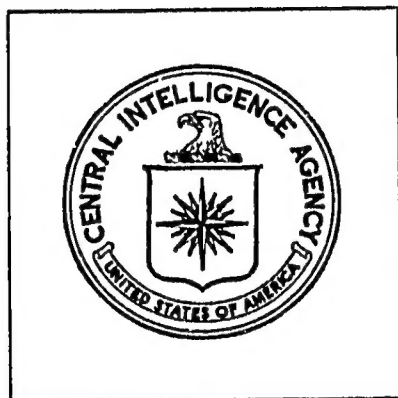


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*The East Asian Continental Shelf:  
Resources, Claims, and Problems*

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BGI RP 74-14  
March 1974

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SUMMARY

Since 1968, when a geophysical survey of the Yellow and East China Seas revealed that the underlying seabed may contain petroleum, the East Asian Continental Shelf has become the scene of one of the great oil hunts on earth. Thirteen oil companies are either exploring or drilling, or negotiating for the right to do so, in 15 hastily granted, often overlapping exploration concessions that stretch in an unbroken chain from the Yellow Sea to the southern tip of Taiwan in the Formosa Strait.

There are some indications that the shelf contains petroleum reserves on the order of those of the Persian Gulf; indeed, the Chinese have brought in a well in Po Hai, the North Vietnamese have reportedly struck oil off Haiphong on the southern margin of the shelf, and Gulf Oil has a producing exploratory well just northwest of Taiwan in the East China Sea. But before the still unknown petroleum wealth of the shelf can be fully developed, one major question must be resolved: How much of the shelf can each of the five nations that share it legally claim?

China, Japan, North Korea, South Korea, and Taiwan -- using one or more of a variety of international laws, all open to a variety of interpretations -- have laid claim to general or specific portions of the shelf. The resulting gross overlapping of claims led to warnings, threats, and mutual animosity. As exploration continues, however, and preliminary discoveries begin to support the more optimistic predictions of the shelf's potential -- and as oil-poor Japan, South Korea, and Taiwan increasingly realize the desirability of cooperative action -- the knotty legal, physical, and political problems that at first threatened development of the shelf seem to be disappearing. Japan and South Korea recently signed an agreement to develop jointly the areas of the shelf they mutually claim, Japan and Taiwan are said to have reached a similar agreement, and China and North Korea have agreed to cooperate in the exploration of the northern Yellow Sea Shelf.

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Central Intelligence Agency  
Directorate of Intelligence  
March 1974

THE EAST ASIAN CONTINENTAL SHELF:  
RESOURCES, CLAIMS, AND PROSPECTS

Great Expectations

1. The world's seabeds are the setting for one of the last major oil hunts on earth. Today more than 130 oil companies are searching for petroleum off the coasts of 80 countries. Offshore production, which now accounts for 18 percent of the world's production of crude oil, may reach 35 percent by 1980. Developing nations and oil-poor nations, with visions of another Persian Gulf on their doorsteps, are scrambling to grant petroleum exploration concessions on their adjacent continental margins. Claims staked out on the seabeds are sometimes larger than the territory of the granting nation and often overlap with those of neighboring states. Seas, once free and open to all, are being marked off and jealously guarded, and vague sea boundaries are being referred to and disputed.

2. The East Asian Continental Shelf came into the spotlight after a 1968 UN-sponsored geophysical survey of the Yellow Sea and East China Sea strengthened earlier suspicions that vast quantities of petroleum might be found there.\* The possibility was of immense interest to the

\* *The East Asian Continental Shelf, as used in this paper, refers to the shelf that underlies Po Hai, the Yellow Sea, the Korea Strait, the East China Sea, that portion of the South China Sea adjacent to the PRC, and the Gulf of Tonkin (Map A, following text).*

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five East Asian nations since only one, the Peoples Republic of China (PRC), is self-sufficient in petroleum. The others have almost no domestic sources of petroleum: Japan's production is less than 1 percent of demand, Taiwan's output is equally insignificant, and North and South Korea produce none at all. And in all of East Asia demand for petroleum is increasing rapidly. Consequently, Japan, Taiwan, and South Korea made unilateral claims on the adjacent seabed, marking off a series of exploration concessions that stretched in an unbroken chain from the North Korea - South Korea border in the Yellow Sea to the southern tip of Taiwan (Map B). Shortly thereafter, survey operations began in at least 10 of these 15 hastily drawn and sometimes overlapping concessions.

3. The potential benefits of close-by sources of petroleum tend to obscure the many real problems and complexities that are likely to arise among East Asian nations in the wake of a major strike. Physical problems related to the shelf, legal technicalities of jurisdiction, and the longer range implications suggest several questions:

- ... Do the physical characteristics of the East Asian Shelf justify the more optimistic predictions?
- ... What legal and economic problems and complexities are involved in division of the shelf?
- ... What are the long range political and economic implications of a major oil strike?

#### Physical Characteristics of the East Asian Continental Shelf

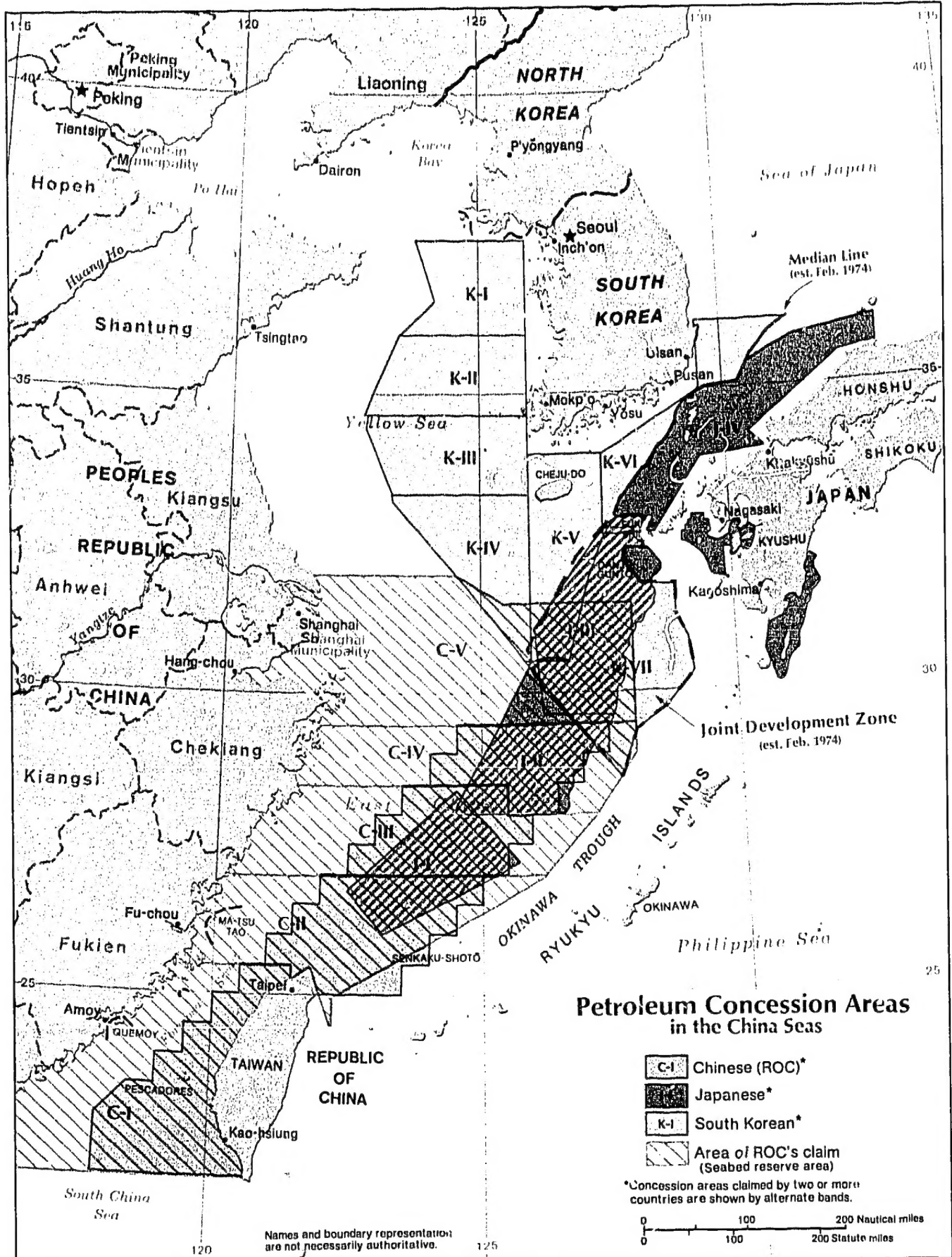
4. The East Asian Shelf is one of the widest and most extensive in the world.\* Stretching 1,700 miles from Po

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\* *The geologic continental shelf is the subsea continuation of a continent extending from the low water line to the depth where there is a marked increase of slope. This increase has been observed to occur at depths ranging from 20 to 550 meters, with the average at 135 meters. International law, by contrast, defines "continental shelf" as that portion of the geologic shelf beyond a state's territorial sea and extending to a depth of 200 meters or to any depth where exploitation of the shelf's seabed resources is possible -- a boundary that technology is steadily pushing seaward.*

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Map B



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Hai to the Gulf of Tonkin, the shelf covers an area of 377,000 square miles, equal to 10 percent of China's land area and to about two and one-half times the area of Japan.\* The shelf's edge occurs at a depth of approximately 120 meters at distances ranging from 70 to more than 500 miles from the mainland.

5. The shelf long was thought to be mainly a barren granitic plate devoid of anything of value. The 1968 UN survey, however, revealed that the shelf actually consisted of a series of alternating ridges and sedimentary basins. Some of the ridges appear above sea level as the Shan-tung Pan-tao (Peninsula) and Liao-tung Pan-tao, the coastal hills and nearby islands of southeastern China, the hills and coastal islands of South Korea, the mountains of Taiwan and Japan, and perhaps the Ryukyu Island chain. The intervening basins are grouped into three larger basins -- the Taiwan Basin, the Yellow Sea Basin, and the Po Hai Basin (Map C). All contain ample accumulations of sediments -- deposited primarily by the Huang (Yellow) and Yangtze Rivers and lesser rivers of South China -- believed to be of the type necessary for the formation of petroleum.

6. In addition to marine sediments of sufficient age, thickness, and chemical composition, the action of a little-understood petroleum forming process and a geologic structure to serve as a reservoir are required for the accumulation of recoverable petroleum. The Taiwan and Yellow Sea Basins contain Tertiary\*\* sediments high in organic content and more than 3,000 meters thick, mostly folded into minor ridges and overlain by porous sandstone -- an association of geologic features ideal for the formation and collection of petroleum. Although the stratigraphy of the Po Hai and South China Sea Basins is less well known, recent oil discoveries in each are suggestive of the potential in each basin.

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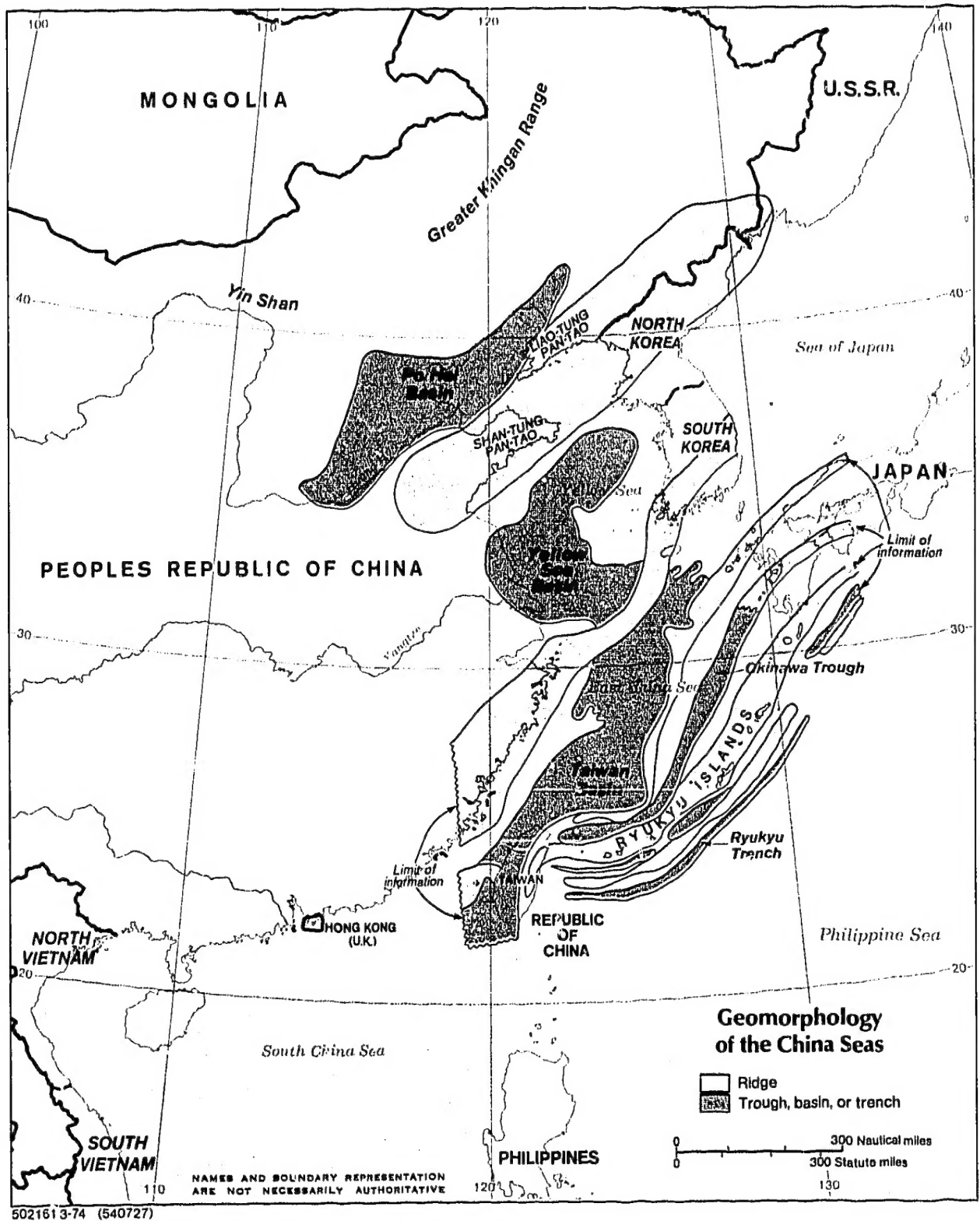
\* All distances are stated in nautical miles.

\*\* An age some 70 to 100 million years ago when much of the earth's petroleum bearing rock was deposited.

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Map C



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Petroleum Prospects

7. Although East Asian nations wishfully view the shelf as a "Persian Gulf East," and some opinions can be marshalled to support this view, evaluations of the petroleum potential of the shelf are mixed. In part, this results from the normal uncertainties of prediction based on conditions that are promising but not yet proven by the drill. Also, there is reluctance on the part of both private companies and nations to be candid about a situation in which the stakes are so high.

8. The more optimistic assessments see the area as "fantastic," one of the ten largest deposits in the world. At the other end of the spectrum are those who state that the chances are 1 in 30 of finding commercial quantities of petroleum. One company rejected an offer to bid for a concession, and another relinquished its concession after preliminary surveys. A middle assessment (though not necessarily more accurate) suggests that the data are encouraging enough to merit exploration.

9. Overall, the prospects for finding petroleum (oil and/or gas) appear better than even. Oil and gas have been produced from landward extensions of the three large shelf basins -- natural gas from western Taiwan and oil from Sheng-li and Ta-ku, on the mainland (Map D). The relationship between the oil shale deposits at Mac-ming in southern China and the geology of the South China Sea Basin is not completely understood, but the presence of oil shale along the margins of the basin offers some encouragement for the petroleum prospects of the basin. Although not a direct landward extension of a shelf structure, the basin on which China's rich Ta-ch'ing field in Heilungkiang Province is located is one of a group of basins in North China geologically related to those that underlie the Ta-ku and Sheng-li oil fields.

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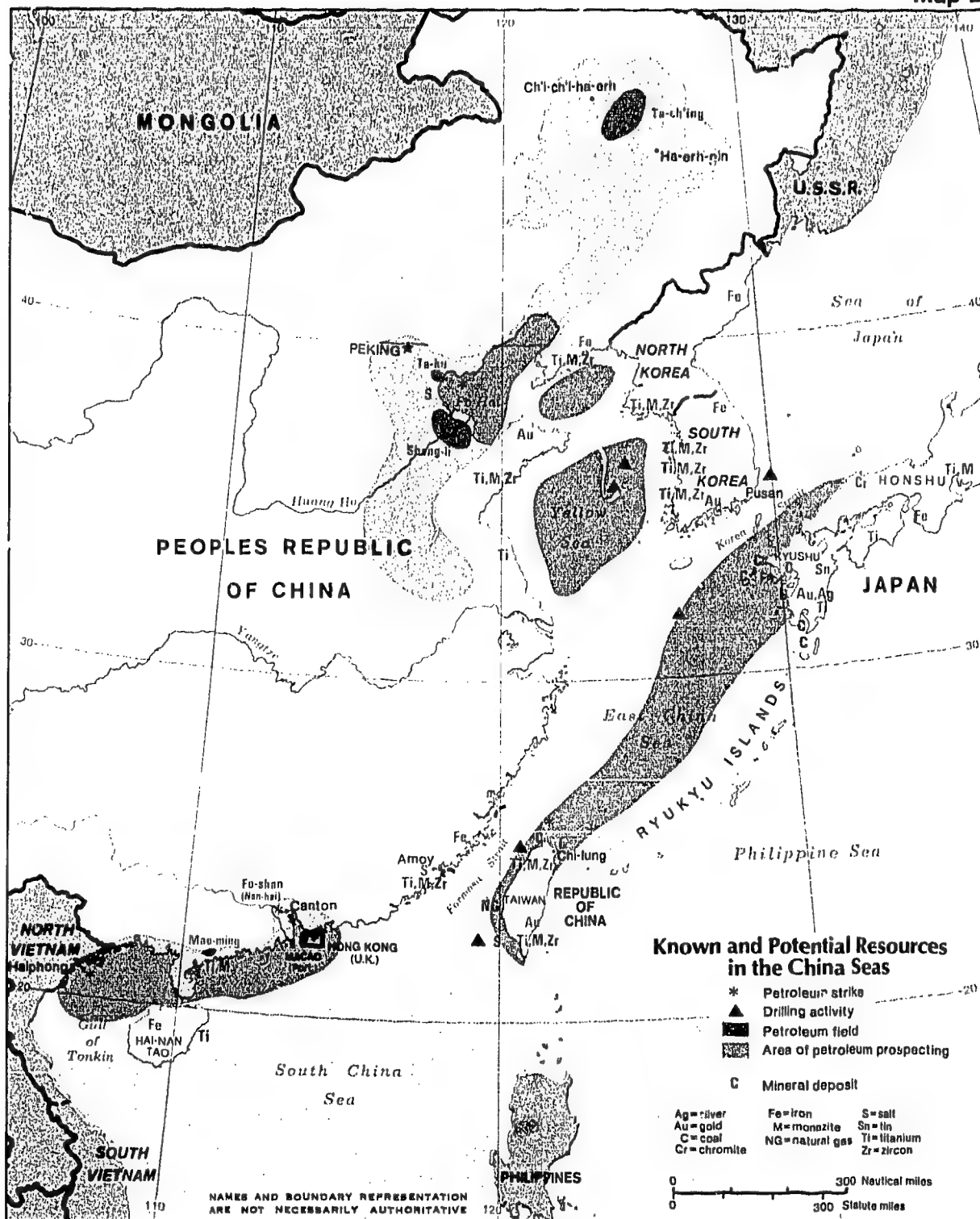
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10. Three oil strikes have been reported on the shelf. The Chinese have brought in a well in Po Hai just offshore from Ta-ku, the North Vietnamese reported a strike just

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Map D



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off Haiphong, and the GLOMAR IV drill rig, working in Gulf Oil's concession, has hit oil 100 miles west of the Senkaku Islands.\* But elsewhere on the shelf drilling has been less successful. Royal Dutch Shell drilled to nearly 4,250 meters (14,000 feet) northeast of Pusan without finding oil, and Gulf and Texaco-Chevron have drilled at least four dry holes in their South Korean concessions (Map D).

11. Bad weather, which has forced abandonment of at least one Yellow Sea drill site, has also hampered activities in the AMOCO, CONOCO, and Gulf concessions in the Formosa Strait and East China Sea off Taiwan. Winds of 40 to 50 knots and 6- to 8-meter (20- to 25-foot) seas, sometimes reaching 12 meters (40 feet), both unusual for this time of year, were continual during the late autumn of 1973.

despite the difficulties and uncertainties, 13 oil companies feel the shelf's prospects are worth a gamble and are in some stage of drilling, geophysical prospecting, or concession negotiation.

#### Who Owns the Shelf?

12. Problems of ownership will intensify if a major petroleum field is discovered on the East Asian Shelf. A case can be made for each nation's claim to portions of the shelf. The sticky question is: How large a portion? Japan, South Korea, and Taiwan have delimited precise exploration concession blocks; in contrast, the PRC and North Korea have made broad statements of ownership.

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Unfortunately, international law governing the drawing of such sea boundaries is vague and open to interpretation. In the case of the East Asian Shelf, no common principle of law was used. Of the 15 concessions drawn, 13 of which represent official sovereignty claims,\* 11 overlap those of another nation and areas that may be claimed by the PRC. Shelf jurisdiction involves knotty legal, physical, and political questions that either singly or in combination could obstruct exploitation and development of petroleum deposits.

### Legal

13. The basic legal principles used to determine continental shelf sovereignty are set forth in the 1958 Geneva Convention on the Continental Shelf. Article 2 permits coastal states to exercise sovereign rights on the adjacent continental shelf for the purpose of exploring and exploiting its natural resources. Article 6 contains the guidelines for dividing up the shelf among the bordering states. (See Appendix) South Korea and Taiwan used still another principle in drawing their shelf boundaries. Termed the "natural prolongation of land territory" concept, it was added to the jargon of international law by the International Court of Justice with its decision on the division of the North Sea Continental Shelf in 1969. This concept presumes that the undersea extension of a state's land territory can be easily distinguished on the sea floor from that of an adjacent or opposite state. Apparently, there were no marine geologists sitting on the court at the time of the decision.

14. Prior to the 1968 UN survey, none of the states bordering the East Asian Shelf had announced any official claim to it; indeed, none had even ratified the 1958

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\* *Seoul's and Taipei's concessions represent official territorial claims since they were delimited by appropriate government agencies and then offered to the oil companies. Japanese law, on the other hand, calls for the oil company to delimit the concession block, which becomes an official Japanese claim only when the Japanese Government approves it. The Japanese Government has yet to approve Blocks J-I and J-II in the East China Sea.*

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Convention. Although each had declared the limits of its own territorial sea -- Japan, South Korea, and Taiwan: 3 miles; China and North Korea: 12 miles -- none had shown much interest in the shelf beyond, lacking the technical capability to explore it and apparently believing it to be of little value.

15. Since the UN survey the shelf states have taken the following actions:

- ... North Korea has made no official claim. Considerable rhetoric, however, has been directed towards South Korea and its "treachery ... in selling the nation's resources to U.S. and Japanese aggressors." North Korea also has protested that South Korea has no right to "strike a bargain with anybody about our continental shelf."
- ... The South Korean Government granted concessions in the Yellow Sea and Korea Strait based on the median line principle and in the East China Sea based on a liberal interpretation of the "natural prolongation" principle. This latter action resulted in gross overlapping of Japan's concessions.
- ... Japan approved petroleum concessions based on the median line principle in the East China Sea and Korea Strait. Its most controversial position could be the location, if approved, of Concession Blocks J-I and J-II, in the East China Sea. Their boundaries derive from Japanese sovereignty over the Ryukyu Islands and from one interpretation of the physical character of the Okinawa Trough.
- ... The Republic of China (Taiwan) ratified the Continental Shelf Convention in 1970, but with reservations on Article 6 pertaining to natural prolongation and islets. Taipei delineated concession blocks in the Formosa Strait, probably on the basis of a median line, and in the East China Sea, using "natural prolongation."
- ... The Peoples Republic of China laid claim to the adjacent shelf (1970), but later stated that jurisdiction of the seas between China and her neighbors had not yet been determined. Peking's actions apparently indicate a willingness to abide by the agreement-between-states clause of the Geneva Convention.

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Physical

16. A basic question that must be answered before sorting out the multiple claims in the East China Sea is the physical character (and hence legal significance) of the Okinawa Trough, a chasm more than 2,700 meters deep and as much as 100 miles wide just west of the Ryukyu Islands (Map A, following text). It is thought by many to mark the edge of the continental shelf between Kyushu and Taiwan. At stake is the legality of Japanese Concession Blocks J-I and J-II, west of the Ryukyus and following generally the alignment of the Trough. To justify these concessions the Japanese Government will have to show that the Trough is merely an irregularity in the shelf, and that the shelf actually ends immediately east of the Ryukyus. Otherwise, Japan will be left with only the disputed Senkaku-shoto (Islands) as a base for any claim to this portion of the shelf.\*

17. Both views can be logically argued. Charts of the area show the edge of the continental shelf, if they show it at all, at the western rim of the Okinawa Trough. Several detailed studies of the shelf likewise conclude that the Trough does separate the Ryukyus from the shelf because the Ryukyus are not geologically a part of the shelf. A counterargument is that the Ryukyu Trench, just east of the Ryukyus and almost three times as deep as the Okinawa Trough, is the true terminator of the shelf.

18. Tokyo might use as legal precedent the decision of the International Court of Justice that permitted Norway, for the sake of equity, to extend her jurisdiction beyond a small, nearshore trough in the North Sea Continental Shelf. Physically, however, the two cases are dissimilar.

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The Norwegian Trough is not nearly as deep or extensive as the Okinawa Trough, and Norway is part of the European mainland, not an archipelago more than 300 miles out to sea. It could also be argued that the Senkakus, together with the Danjo Islands, located some 450 miles to the north and likewise perched on the western edge of the Trough, are points on the base line from which Japan's territorial sea is measured.\* This line of reasoning would, in effect, define the sea between the Senkaku-Danjo baseline and the Ryukyus as internal waters and permit Japan to claim territorial sea west of the baseline and to construct a median line considerably closer to the mainland than to the Ryukyus. But in light of precedents already set by similar boundary litigation, this contention is shaky and Japan could use it in negotiations only as a bargaining point. Previous boundary agreements have not allowed the use of small islands a considerable distance off shore as base points from which to measure the territorial sea. Such islands, however, can "slightly" alter the boundaries of a state's territorial sea in favor of the state that owns them. How slightly, of course, depends upon the skill of the negotiators. Overall, the evidence weighs heavily against Japan; her claim in this area of the East China Sea could well be reduced to the waters in the immediate vicinity of the Senkakus.

### Political

19. The conflicting claims of Taiwan and the Peoples Republic of China are likely to provoke controversy should a major oil strike occur in the East China Sea. Taiwan has defined five "seabed reserve areas" that extend from the mainland -- reflecting Taipei's contention that it is

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\* Article 3 of the 1958 Geneva Convention on the Territorial Sea and the Contiguous Zone sites the low water line along the coast as the normal baseline from which to measure the breadth of the territorial sea. Article 4 allows states that have deeply indented coastlines or that have fringes of islands in the immediate vicinity of their coasts to construct an artificial baseline by joining with straight baselines "appropriate points" on the seaward coasts of the islands and headlands between the indentations.

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the legitimate government of all of China -- to the 200-meter isobath and north to the approximate latitude of Shanghai (Map B). The discovery of petroleum in Concession Blocks J-I and J-II in the East China Sea, drawn by Japanese petroleum companies, would involve Japan in a three-way dispute with both Chinese Governments. Drilling, however, is still contingent on Japanese Government approval of applications from these companies.

20. Another area of possible controversy is the South Korean Yellow Sea concessions. Although the South Korean-PRC median line appears to be equitably drawn, South Korean concessions extend slightly west of it -- a purposeful act that South Korean officials admit privately was done as a bargaining ploy. But what South Korea hopes to gain is unclear. A joint development agreement with the PRC seems unlikely since Peking has repeatedly voiced its opposition to foreigners' exploiting its continental shelf -- though some indications of a PRC willingness to jointly develop the Po Hai resources with Japan have been reported. For South Korea to haggle for a reduced portion of the concession beyond the median line seems hardly worth while, for the entire extension is not very great. But since no oil has been found, and in any event the oil companies are working safely east of the median line, a South Korean agreement with the PRC does not now seem necessary.

21. The northern boundary of South Korea's Yellow Sea concessions, 37°35' N, overlaps the North Korean 12-mile territorial sea claim. Recently heightened tensions between North and South Korea over a number of offshore islands may presage actions by P'yongyang that could cause Seoul to consider redrawing the boundary.

22. Several questions of ownership have been resolved through bilateral negotiations between shelf states. Japan and South Korea have recently concluded an agreement to develop jointly the areas of the Korea Strait and the East China Sea where their concessions overlap, sharing equitably in the revenue from whatever petroleum might be found.

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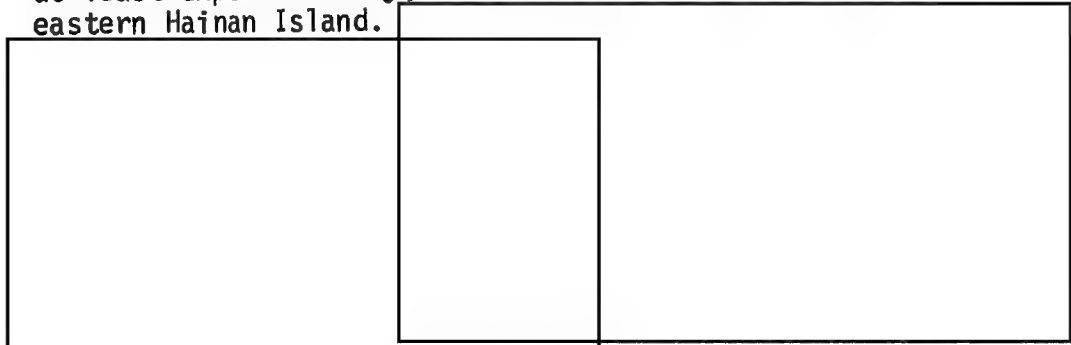
[REDACTED] And North Korea and the PRC have agreed to explore jointly the northern Yellow Sea Shelf.

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23. The equitable division of the East Asian Shelf should be possible since all of the surrounding states have either demonstrated or expressed a willingness to discuss the problem. Adequate guidelines, which may be improved at the Third UN International Conference on the Law of the Sea, are already available in Paragraphs 1 and 2 of Article 6 of the 1958 Shelf Convention. All five states have sent representatives to one or more of the preparatory sessions for the LOS Conference, scheduled to be held in Caracas, Venezuela, during the summer of 1974. The rapport developed among delegates and the prospect of universally accepted statutes governing the sovereignty and uses of the sea may encourage the East Asian states to agree amicably on a division of the shelf.

#### Other Shelf Resources

24. The only nonliving resources now taken in any quantity from the shelf and its overlying waters are coal from mines on northern Taiwan and on Kyushu begun on land and later extended under the sea, iron from similar mines on western Kyushu, and salt that is evaporated from sea water, most extensively along the coast of Po Hai. Other minerals have not been exploited to any extent, primarily because the supply from land sources has so far been sufficient. The shelf potentially contains the same array of minerals now mined on the adjacent land masses, and it is possible that deposits of still other minerals exist near shore. The PRC is believed to be removing titanium, at least experimentally, from the mud of a small bay on eastern Hainan Island.



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25. The living resources of the East Asian Shelf are well known. More than 600 species of fish, shellfish, and seaweed are harvested, and the shelf states cooperate in varying degrees to ensure that these resources will not

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be depleted. The states also experiment with and practice various forms of sea farming -- nurturing fish spawning grounds and cultivating shellfish and seaweed. New techniques and equipment are producing increasing yields from the shallow waters of the shelf.

Outlook

26. The effect of any significant discovery of oil or gas in the East Asian Shelf on the economy of the region, or the world, will be long term. After an oil strike, 6 to 18 months or longer would be required to reach commercial production and an additional 2 to 3 years to fully develop a field.

27. Complex UN-sponsored decisions probably will have little bearing on delimitation of the shelf in the Yellow and East China Seas; the states involved will make their own settlements, which according to Article 6 of the 1958 Shelf Convention, is the preferred approach. A mutually accepted, equitable division of the shelf would be a serendipitous spin-off of the oil hunt. Another would be the discovery of an economically exploitable deposit of another resource -- cobalt, for example, or nickel, or even uranium. Petroleum, however, will remain -- and probably increasingly so in the light of current world events -- the lure that will focus continuing attention on the still unknown potential of the East Asian Continental Shelf.

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APPENDIX

Paragraphs 1 and 2, Article 6, Convention on the Continental Shelf:

1. Where the same continental shelf is adjacent to the territories of two or more States whose coasts are opposite each other, the boundary of the continental shelf appertaining to such States shall be determined by agreement between them. In the absence of agreement, and unless another boundary line is justified by special circumstances, the boundary is the median line every point of which is equidistant from the nearest points of the baselines from which the breadth of the territorial sea of each State is measured.

2. Where the same continental shelf is adjacent to the territories of two adjacent States, the boundary of the continental shelf shall be determined by agreement between them. In the absence of agreement, and unless another boundary line is justified by special circumstances, the boundary shall be determined by application of the principle of equidistance from the nearest points of the baselines from which the breadth of the territorial sea of each State is measured.

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